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ABSTRACT

This report is the third annual edition of a syndicated study which focuses on developing an understanding of the major issues and events which give shape to computing and information technology across K-12 education in the United States. This report builds on trendline data from the 1992-93 and 1993-94 studies. The survey results presented in this report are based on the responses of school districts representing about 10.5% of the entire U.S. K-12 public school enrollment. Three topical sections comprise this report: management, installed base, and technology's impact on instruction. The first section focuses on site-based management and ability to purchase information technology, as well as funding sources for information technology. The second section describes instruction and administration installed bases of personal computers; installed base changes since 1994; the proportion of districts with "mostly" one genre of computer; and perspectives of CD-ROM drive growth. In terms of technology's impact on instruction, the third section discusses personal computer locations and connectivity; technology integration into the curriculum; student-to-personal computer ratios; ownership of personal computers; home use of instructional software; district plans to integrate home software into the curriculum; family involvement; and distance learning. Seventeen charts present information related to the three major topics. (AEF)

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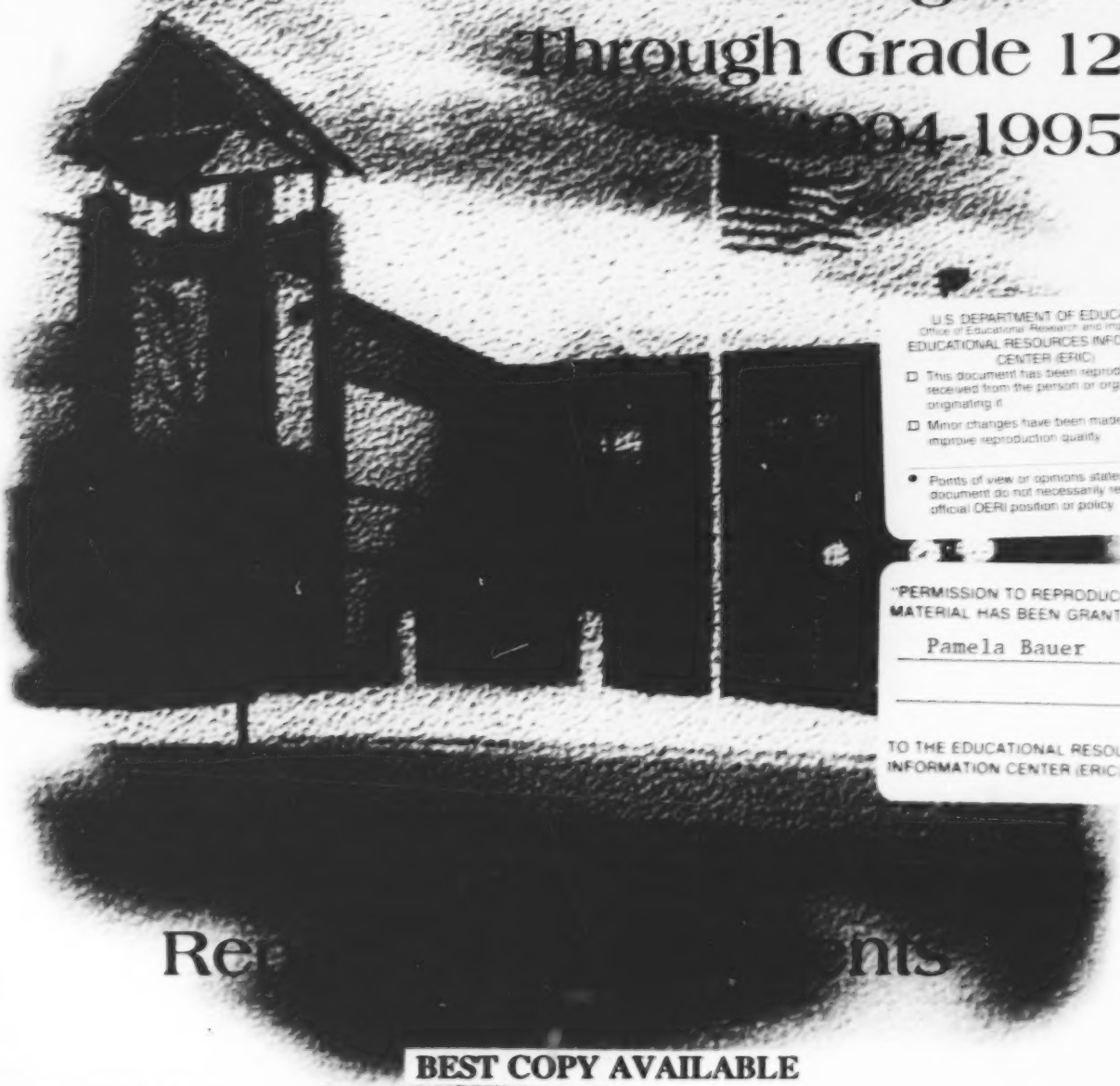
Understanding Information Technology

In Kindergarten Through Grade 12

1994-1995



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INTRODUCTION

Understanding Information Technology in Kindergarten through Grade 12 1994-1995 is the third, annual edition of our syndicated study. Its subscribers include many leading vendors who market information technology products and services to K-12 education.

This year's edition builds on trendline data from our 92-93 and 93-94 studies, and focuses on developing a detailed understanding of the major issues and events which give shape to computing and information technology across K-12 Education in the U.S.

The survey results presented in this report are based upon the responses of school districts representing about 10.5% of the entire U.S. K-12 pubic school enrollment.

This report was specifically written for respondents. Our goal is to provide a detailed understanding -- across several dimensions -- of the current state of K-12 information technology infrastructure and its implementation across both the administrative and the curricular realms.

In keeping with the two previous editions of this report, we have selected items for this report which either describe some of the most significant topics related to technology's impact on instruction, or those which build on a baseline for understanding the information technology infrastructure in K-12. This report is segmented into three major sections: Management, Installed Base, and Technology's Impact on Instruction.

To all of you who responded to this Study, a very special thanks. We appreciate your contributions and hope that you find this report both informative and enlightening. As always, your suggestions for improvement are most welcome... We look forward to hearing from you.

Carole Cotton
Study Director

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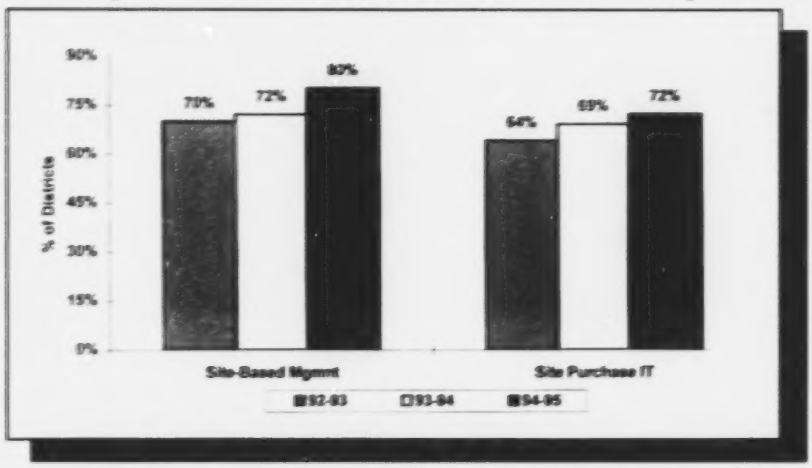
MANAGEMENT

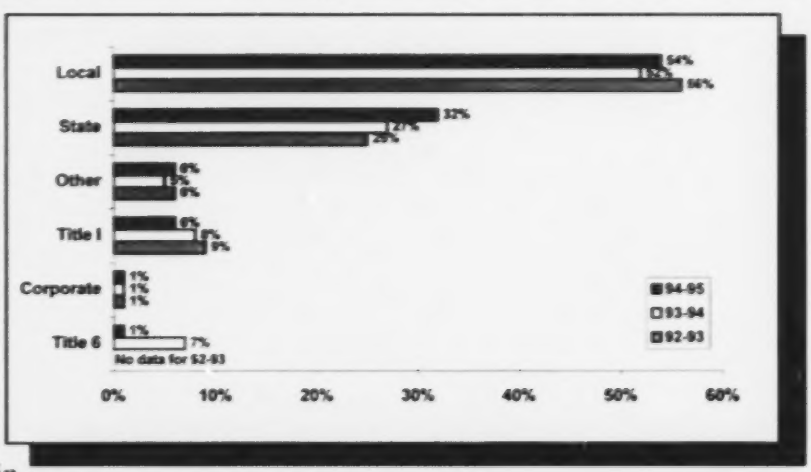
Site-Based Management and Site's Ability to Purchase IT

We have seen continued growth in district support for site-based management, with the proportion of districts increasing from **70% in 92-93 to 80% in 94-95**. As expected, smaller districts are less likely, while larger districts are more likely. The actual response patterns range from a low of 72% in districts with fewer than 1,000 students to a high of 94% in those with more than 25K students. Of those districts which support site-based management, **72% -- up from 64% in 92-93 and 69% in 93-94 -- also support a site's ability to purchase Information Technology**. Once again, we find the largest districts leading the charge, where 90% of the largest districts (25K+) support site purchases. In contrast, only 72% of the smallest support this site option.



Funding Sources for Information Technology

Which funding sources enable IT expenditures? For three years in a row, we found no significant shift in the sources used to fund information technology. **Local Funding, at 54% overall**, varies somewhat by district size and widely by relative wealth. It represents 36% of the total funding in low wealth districts; 56% in medium wealth districts; and 72% in high wealth districts. **State Funding**, with regard to the relative wealth of the district, is almost a mirror image of Local Funding. Where Local Funding is high, State Funding is low... and vice versa. **Overall State Funding accounts for 32%** of total funding, but varies as follows: 17% in High Wealth districts; 31% in Medium, and 41% in Low Wealth. **Title 1, (formerly Chapter 1) , accounts for only 6%** of the total, and is usually concentrated in low and medium wealth districts. **Title 6 (formerly Chapter 2) and Corporate Funding, each represent only 1% of the total**, and are too low overall to measure any significant patterns across the various district sizes and types.



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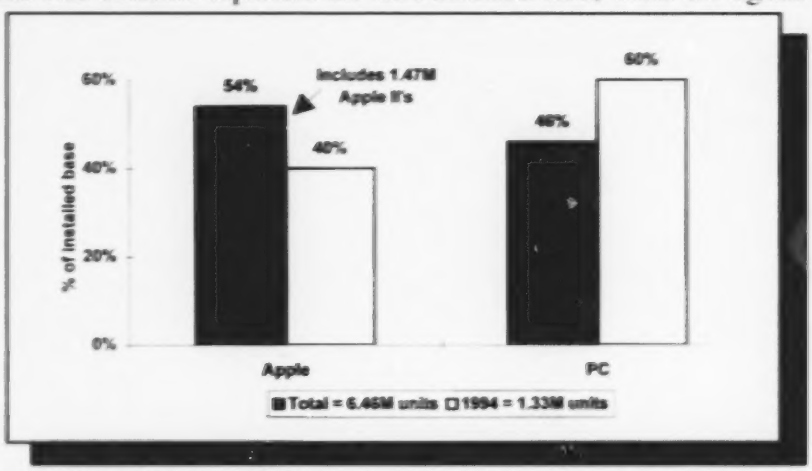
INSTALLED BASE

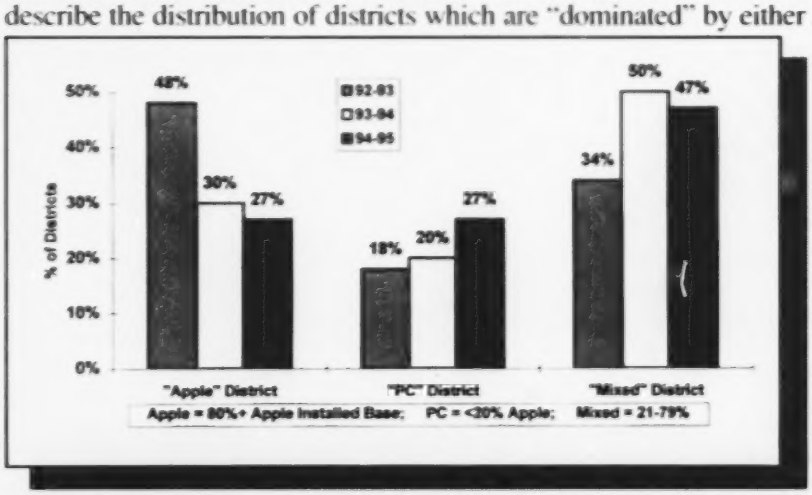
Installed Base Changes since 1994

We have estimated the TOTAL (Instruction & Administration combined) installed base of personal computers to be 6.5 million units–up from 5.4 million in 93-94. The chart below describes two different dimensions of the installed base. The dark blue columns represent the total installed base, while the lighter columns represents the number purchased/installed during 1994. Why two views? **The Total depicts the entire installed base, while the year 1994 provides a "snapshot" of recent purchases**, the significance of which might be "lost" in the total installed base. Recent purchases are often a good indicator of current consumer preferences. For example, if we only considered the total installed base, we might assume that **Apple's lead, with 54%** of the Total, might not be challenged for several years. However, when we focus on "recent" purchases, we can see that **PCs garnered 60% of the total purchases in 1994**. Further, this is the third year in a row that we have seen "recent" Apple purchases fall below their proportion of the total installed base.



What Proportion of Districts have "Mostly" One Genre of Computer?

The chart below includes the combined Instruction and Administration installed base, and is intended to describe the distribution of districts which are "dominated" by either Apples or by PCs, versus those which are "mixed." **The district mix is defined as follows: Apple Districts = 80% or more of the installed base is Apple; PC Districts = 20% or less of the installed base is Apple; Mixed Districts = 21-79% of the installed base is Apple**. We believe that the results -- as measured since the 1992-1993 school year -- reflect three separate, but overlapping trends: 1. The declining dominance of Apple; 2. The preference parity between PC & Apple in districts where there are pronounced preferences for either Apples or PCs; and, 3. The reality of a *genuinely* dual platform installed base in K-12. Given this time of significant turmoil in the personal computer market, it will be interesting to see what changes -- if any -- we will find next year.



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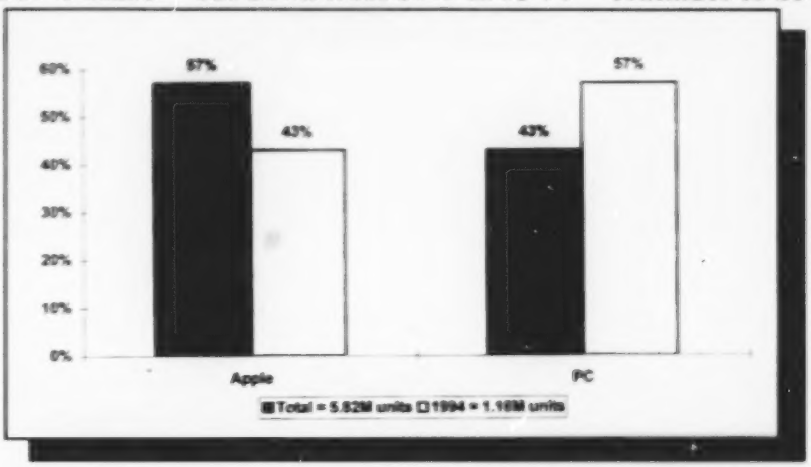
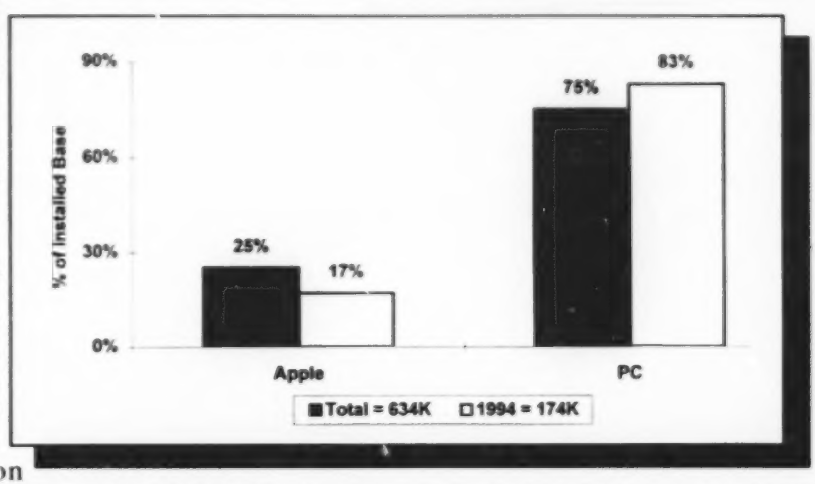
Instruction Installed Base

Approximately 90% -- **5.82 million units** -- of the Total (Instruction & Administration) installed base of personal computers is devoted to Instruction. We have estimated that over **1.1 million units were purchased during 1994. Apple, with a 57% share -- but down from 59% in 93-94 -- continues to be the predominant platform. Apple IIs, at over 1.4 million units** and down from 1.7 million units in 93-94, represent 24% of the total Instruction installed base, and 42% of Apple's installed base in Instruction. The installed base operating system mix suggests that the **preponderance of both the Apple Macintosh (excluding Apple II) AND the PC segments are capable of running current generation curriculum software.** Sixty percent of Instructional Apple/Macintosh systems are running System 7. Fifty-two percent of all Instructional PCs are running Windows, and 40% are Windows95-ready (386DX or higher; 4 MB RAM or higher; and 200+ MB hard drive or higher). Shifting our perspective from that of the Total Instruction installed base to that which describes "recent" purchases, we find -- for **two years in a row -- that recent (1994 & 1993) personal computer purchases have favored PCs over Apple**. PCs accounted for 57% of all Instruction purchases in 1994 and 56% in 1993. Further, with regard to personal computers purchased/installed during 1994, PC purchases were dominant in all districts except those with 10-25K students, where they are roughly equivalent to Apple.



Administration Installed Base

Approximately 10% -- **634 thousand units** -- of the Total (Instruction & Administration) installed base is devoted to Administration. Of the Total Administration installed base, we estimate that **just under 174 thousand units were purchased during 1994. PCs, with a 75% share -- and up from 62% in 93-94 -- continue to be the predominant platform**. Sixty-six percent of the Administration PCs are running Windows, and 59% are Windows95-ready (386DX or higher; 4 MB RAM or higher; and 200+ MB hard drive or higher). Seventy-three percent of Apple Macintosh systems in Administration are running System 7. Shifting our perspective from that of the Total Administration installed base to that which describes 1994 purchases, we find -- for two years in a row -- that **recent (1994 & 1993) purchases have been dominated by PCs**. PCs accounted for 83% of all Instruction purchases in 1994 and 57% in 1993. With regard to Administrative purchases during 1994, PCs dominate in all districts sizes. Overall, they dominate by almost a factor of 5-to-1.



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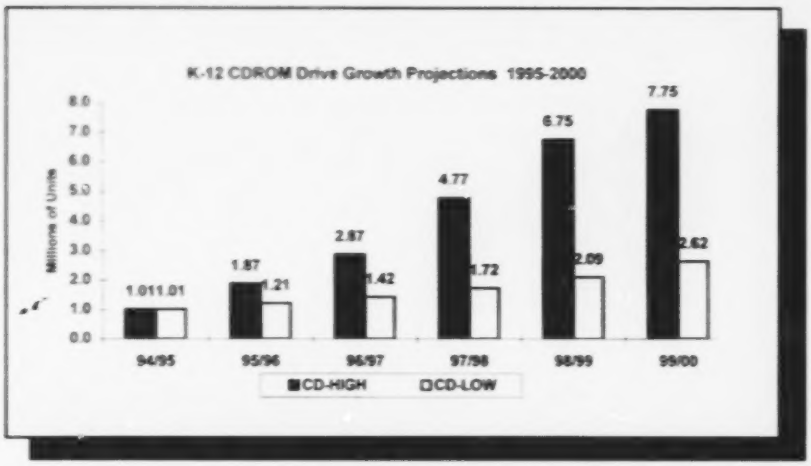
Projecting CDROM Drive Growth

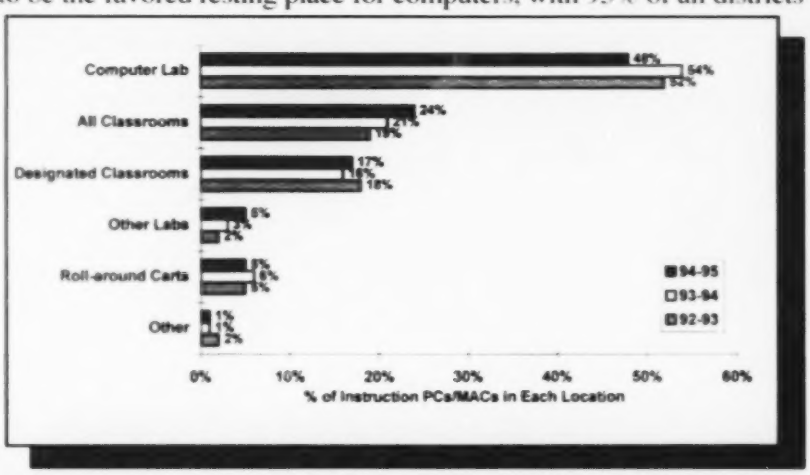
The chart below describes two different perspectives on CDROM drive growth. The **CD-LOW** estimate assumes that schools will have the economic option of buying new personal computers with or without CDROM drives and, that they will not upgrade their existing installed base with CDROMs. The CD-HIGH estimate assumes that market forces will propel schools to purchase most, if not all, personal computers with CDROM drives (i.e. computers will be packaged such that buying them with CDROMs will provide better value). For analytical purposes, we have assumed that 50% of the **new additions** to the installed base in 95-96 and 75% of those in 96-97 will include CDROM drives. Thereafter, ALL new personal computers will include CDROM drives. Which scenario is most likely? While we cannot guarantee the accuracy of our crystal ball, our "best guess" is that most personal computers will include CDROM drives <u>until</u> schools and districts install high bandwidth networks. Thereafter, multimedia servers will likely replace CDROM drives.



TECHNOLOGY'S IMPACT ON INSTRUCTION

Personal Computer Locations

For three years in a row, we have seen *relatively* little movement in the location of all personal computers used in Instruction. **Computer Labs** continue to be the favored resting place for computers, with 95% of all districts indicating that they have "some" personal computers located there. But there is progress. For the first time, we find that **less than half (48%) -- approximately 2.8 million -- of all Instructional computers are in computer labs**. The goal, of course, is to move the computers out of the labs and into the places where the teachers and kids live... like ALL classrooms. Overall, 24% -- 1.4 million or roughly half the number found in computer labs -- of all Instructional personal computers are found in ALL classrooms... But the best news lies beneath this top layer of analysis. **Sixty-seven percent -- up from 59% in 93-94 and 40% in 92-93 -- of the districts indicated that they have "some" computers in ALL classrooms. Designated classrooms** are the next most likely place to find Instructional personal computers. Over the past three years, we have seen <u>no</u> significant movement to or from this area. Overall, 17% of all are found here. Fifty-eight percent of all districts indicated that they have "some" computers in this area.



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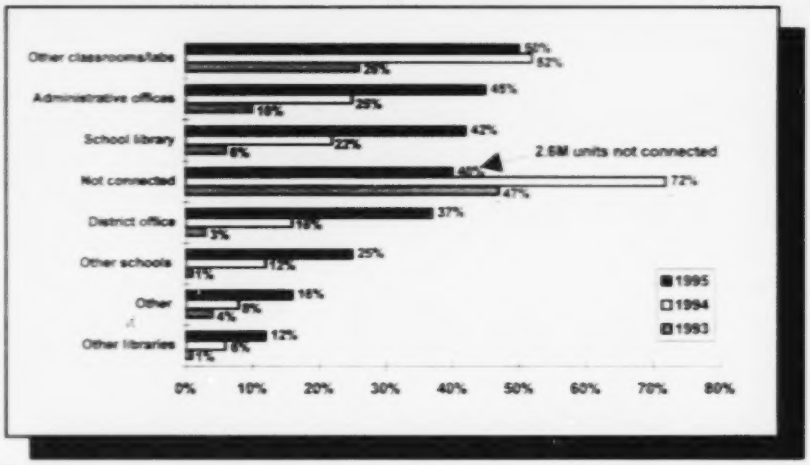
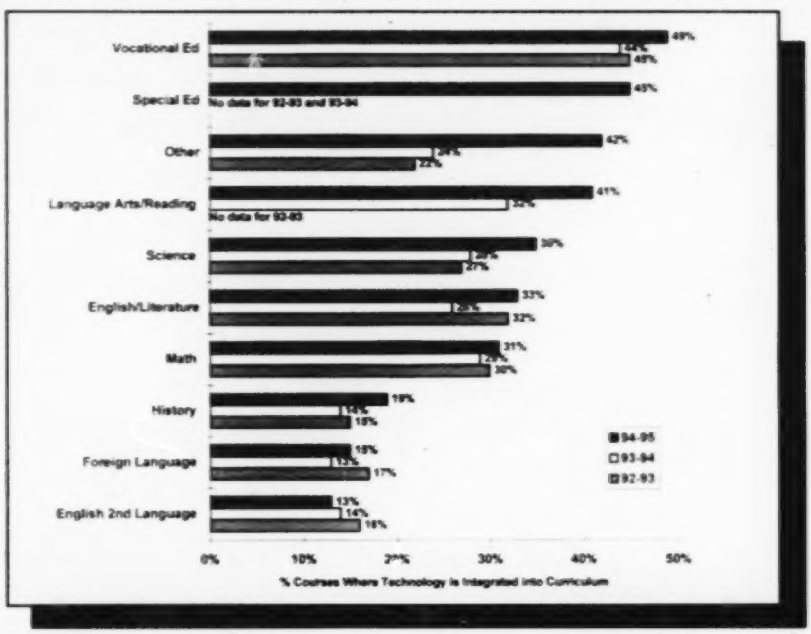
Personal Computer Connectivity

The good news is that in spite of adding over 1 million personal computers to the installed base, the number of "unconnected" systems fell from 3.6 million units last year to 2.6 million this year. This means that **3.8 million -- 60% -- of all K-12 personal computers are connected**. Further, "connected" personal computers are now connected to more areas. Of course, the bad news is that 2.6 million units -- 40% -- of all personal computers remain "unconnected." Smaller districts have a higher proportion of unconnected personal computers than do larger districts. The district patterns for connections to **Classrooms/Labs** have not changed substantially from last year, in that smaller districts have a higher proportion of their personal computers connected to Classrooms/Labs than do their larger counterparts. **Administration Office** connections **increased 80% over last year to 45%**. District patterns range from a low of 35% in 2.5-5K districts to a high of 57% in 25K+ districts. Likewise, **School Library connectivity increased over 90% to 42%**, and there is little difference among the districts, except in the 25K+ districts, where the connectivity rate is only 32%.



Technology Integration Into the Curriculum

By "integrated" we mean that technology is used within the course instruction as differentiated from computers used in desktop publishing, etc. For the first time in three years, we can see a *measurable* increase -- in several subject areas -- in the mean percentage of courses where technology has been integrated into the curriculum. Most notably, Language Arts/Reading has increased from 32% in 93-94 to 41% in 94-95. "Other" has almost doubled from 24% in 93-94 to 42% in 94-95. It includes: art, business, computer science, drafting, homemaking, industrial arts and music. What proportion of districts have integrated technology into ANY courses? The responses by subject follow: Math = 89%; ESL = 35%; Foreign Language = 52%; Science = 88%; History = 71%; Language Arts/Reading = 88%; English/Literature = 77%; Special Education = 89%; Vocational Education = 81%; and "Other" = 10%.



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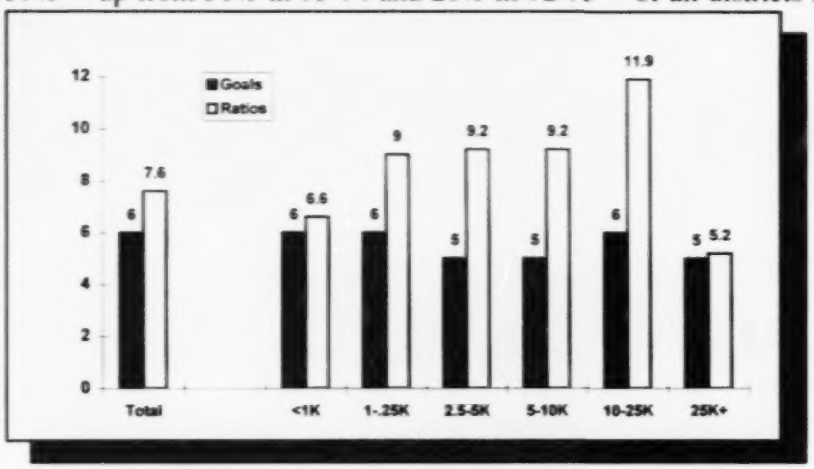
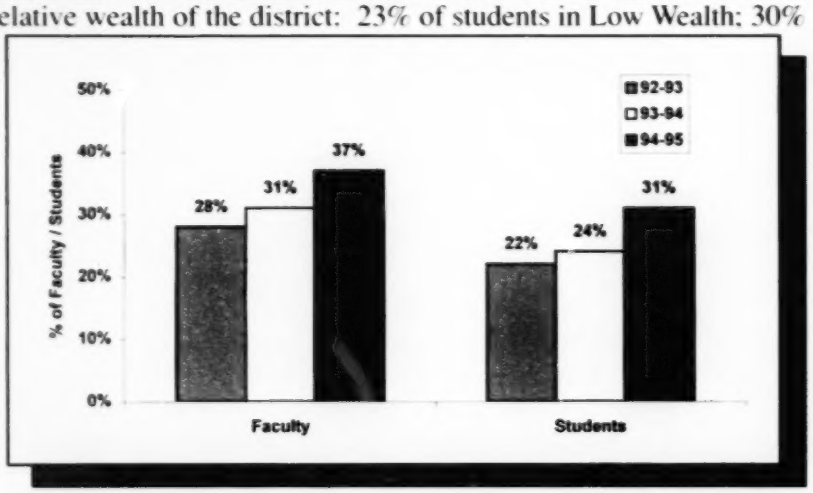
Comparing Current Student-to-Personal Computer (PC/MAC) Ratios to Goals

The chart below compares the student-to-PC ratio we found by dividing the Fall 1994 NCES estimated enrollment of 44.3 million students by the installed base of 5.82 million **Instructional** personal computers, against district goals from our survey responses. **Please note that not all Districts have a goal**. In 94-95, 39% -- up from 31% in 93-94 and 20% in 92-93 -- of all districts indicated they had a goal for student-to-PC ratios. Generally, large districts are much more likely to have a goal than smaller districts. We estimate the national student-to-PC (PC/MAC) ratio to be 7.6 students to 1 PC, down from 8.8 in 93-94. What are the district patterns? They are best -- lowest -- for two years in a row, in the smallest (<1K students) and in the largest (25K+ students) districts. The national goal is **6 students to 1 PC, and as a group, they expect to reach their goal by 1998**.



Personal Ownership of Personal Computers

Personal ownership is defined as PC & Apple systems purchased, with personal funds, by faculty and students for home use. We have seen a significant increase in personal ownership -- for both faculty and students -- over the past year. **We estimate that over 13 million students have PCs at home**. Student ownership varies dramatically with the relative wealth of the district: 23% of students in Low Wealth; 30% of students in Medium, and 51% of students in High wealth. Faculty ownership also varies with relative wealth, though not as dramatically as student home ownership: 33% in Low Wealth; 36% in Medium, and 45% in High Wealth. While both faculty and student personal ownership have increased for ALL districts, regardless of relative wealth, **the inequities continue to be glaring!** Further, the gap between the "haves and have-nots" continues to widen as more districts integrate the home use of instructional software into the curriculum.



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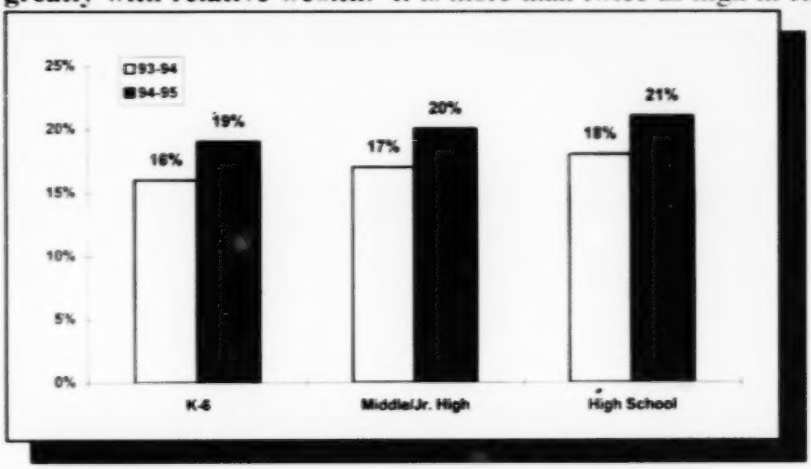
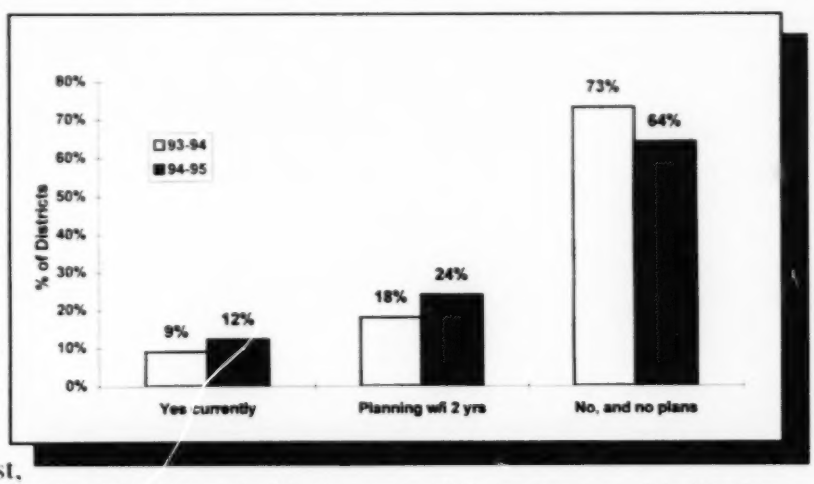
Home Use of Instructional Software

Home use of instructional software -- like that of personal computers -- continues to rise and also **varies greatly with relative wealth**. It is more than twice as high in High wealth districts than in Low wealth districts. We have estimated that **just under 9 million children -- 19% of public school enrollment -- use instructional software at home**: 5 million in K-6; 1.3 million in Middle/Jr. High, and 2.4 million in High School. Home usage of instructional software is just one piece of the puzzle. The exponential benefits to students do not usually occur until home use is integrated into the curriculum... and it appears that an increasing proportion of districts are jumping on this bandwagon!



District Plans to Integrate Home Software Into Curriculum

Overall 36% -- up from 27% in 93-94 -- of all districts are either currently or planning to integrate home software usage into the curriculum. Most districts will include all grade ranges. We estimate that **just under 16 million students are/will be affected:** 9.4 million in K-6; 2.3 million in Middle/Jr. High; and 4.1 million in High School. Oddly, the district size plays a more significant role in district intentions than does relative wealth. The "Yes Currently" numbers are higher in high enrollment districts than in their smaller counterparts, with responses ranging from a low of 8% in districts with <1K students to a high of 40% in those with 25K+ students. In contrast, relative wealth responses vary from 12% in High; 11% in Medium; to 16% in Low wealth districts... The BIG question is who will fund this endeavor in low wealth districts.



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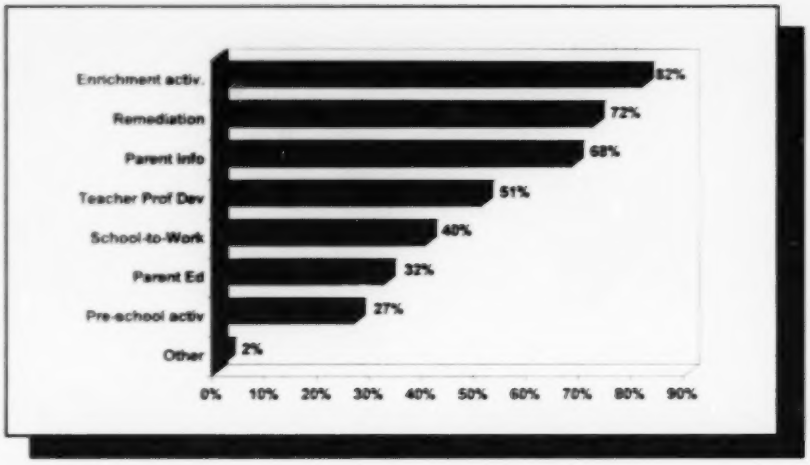
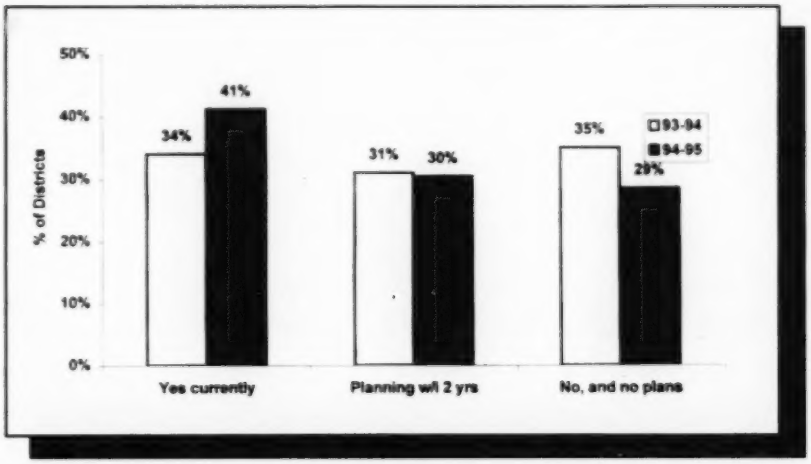
Family Involvement

When districts are currently or planning to integrate the home use of instructional software into the curriculum, most -- **93% plan to include family involvement**. The next question, of course, is: What types of family involvement? Enrichment tops the list and is highest in 25K+ districts (94%) and lowest in 1-2.5K districts (74%). With 72% responding, **Remediation** is next. It is highest in 5-10K districts (94%) and lowest in 25K+ districts (59%). **Parent Information** garnered 68% of responding districts. It is highest in 25K+ districts (73%) and lowest in <1K districts (58%) So much for the good news... Technology-mediated, home-to-school connections only work if a critical mass of students and families have access to the hardware (computer, set-top box, Internet appliance, CDROM, etc.). Clearly, not all families can afford to purchase hardware. How are districts planning to overcome this obstacle? Who will provide funding for family hardware? Topping the list, **with 69% overall, is Parents**. As expected, responses varied with Relative Wealth, and range from 79% in High Wealth, 73% in Medium, to 52% in Low Wealth districts. The final two categories: **District-supplied, with 55% and Vendor-supplied, with 18%**, yield no significant district patterns.



Distance Learning

With 41% -- up from 34% in 93-94 -- of districts currently engaging in distance learning... and another 30% planning... Distance Learning is not a trend, it is a reality with the near-term-potential (where potential = total enrollment in 71% of all districts) to involve over **31 million students in K-12 public education**. Why are these numbers so high? In general, the momentum toward distance learning is driven by two factors: the demand for time and place independence and economic issues. When districts engage in distance learning most do not involve ALL students in the district. Overall, **13% of all students are involved**. As expected, some districts are further along than others, and the patterns are associated with enrollment, where larger districts are more likely than their smaller counterparts.. Who are the naysayers, the 29% with no plans? In general, districts with higher levels of district wealth are more likely to say "no and no plans" than those with lower wealth.



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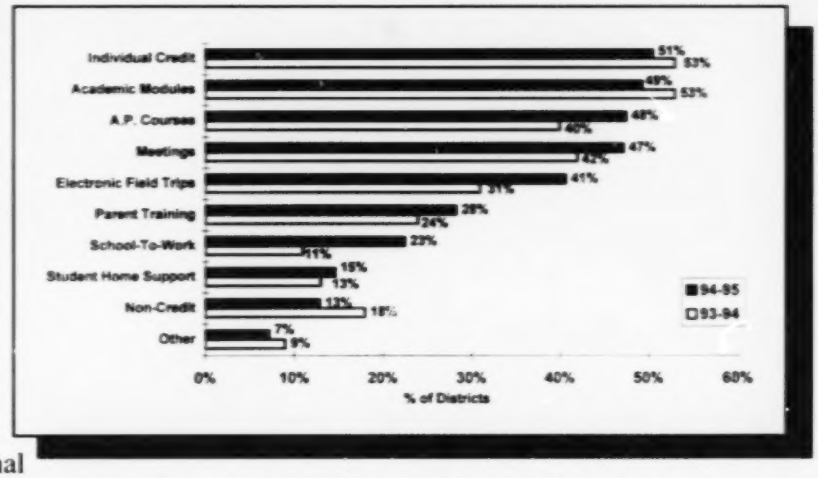
How Will Distance Learning Be Used?

For two years in a row, we find that approximately 50% of all districts are using distance learning in the main "business of education," that is: in K-12 academic modules and independent credit courses. Again, some districts are further along than others, and the patterns vary with enrollment: **Independent credit courses** are strongest in <1K districts (55%) and weakest in 5-10K districts (44%); **K-12 academic modules** are strongest in 25K+ districts (63%) and weakest in <1K districts (44%); and **AP courses** are strongest in 1-2.5K districts (54%) and weakest in 10-25K districts (32%). **Other** includes: adult learning, student collaboration, weather records, and staff development. Combining the statistics for distance learning with those for integrating the home use of instructional software into the curriculum, we see a definite pattern of the instruction (and learning) process moving into the overlapping realms of **technology-mediation and time and place independence**.



Demographics & Methodology

This survey was addressed in the first quarter of 1995 to essentially all public school districts in the United States. The sample of respondents represents about 10.5% of all public school enrollment. The sample precision, at the 95% confidence level, is ± 2.2%.

Throughout this report, we have made reference to various analyses based upon enrollment range, metro status, and relative wealth. **Enrollment Range** is the actual district enrollment; **Metro Status** divides districts into areas based on Metropolitan Statistical Areas (MSA) classifications and populations of: Urban, Suburban or Rural; **Relative Wealth** factors are derived from the Orshansky Percent of Universe. It represents the number of students falling below the Federal Government poverty guidelines within a district's boundaries. We have used the inverse of the Orshansky numbers as a relative indicator of community wealth. For purposes of this analysis, we have defined the following categories of relative wealth: High = 95% + of children above poverty; Medium = 75-94.9% above poverty; and Low = < 75% above poverty.

In several cases, data from our 1992-1993 and 1993-1994 Studies were referenced. The sample precisions are similar. The survey populations are not identical.

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